



US007404828B1

(12) **United States Patent**
Nicola

(10) **Patent No.:** **US 7,404,828 B1**
(45) **Date of Patent:** **Jul. 29, 2008**

(54) **METHOD FOR THE PRODUCTION OF PARTICLES**

6,572,831 B1 6/2003 Nicola 422/256

FOREIGN PATENT DOCUMENTS

(75) Inventor: **Mazin Nicola**, Worthing (GB)

WO WO 96/01221 1/1995

WO WO 96/00610 1/1996

(73) Assignee: **Glaxo Group Limited**, Brentford, Middlesex (GB)

WO WO 96/29998 10/1996

WO WO 9858722 12/1998

WO WO 99/59710 11/1999

WO WO 01/03821 1/2001

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 423 days.

OTHER PUBLICATIONS

(21) Appl. No.: **10/130,204**

Ind. Eng. Chem. Res. 1998, 37, 1821-1826 Highly Efficient Additive for Isotactic PP Marco et al.

(22) PCT Filed: **Nov. 15, 2000**

Ind. Eng. Chem. Res. 1999, 38, 3898-3902 Precipitation of Polystyrene by Spraying Polystyrene-Toluene Solution into Compressed HFC-134a Chung-Sung Tan and Hung-Yuan Lin.

(86) PCT No.: **PCT/GB00/04350**

J. App. Polymer. Sci., 2001, 84, 1657-1668 Formation of Micron-Sized Cycloolefin Copolymer from Toluene Solution Using Compressed HFC-134a as Antisolvent, Ren-Yong Hsu, Chung-Sung Tan, Jen-Min Chen.

§ 371 (c)(1),

(2), (4) Date: **May 15, 2002**

U.S. Appl. No. 11/293,399; Nicola.

U.S. Appl. No. 10/494,962; Nicola.

(87) PCT Pub. No.: **WO01/36078**

* cited by examiner

PCT Pub. Date: **May 25, 2001**

Primary Examiner—Edward M Johnson

(30) **Foreign Application Priority Data**

(74) *Attorney, Agent, or Firm*—Andrea W. Burke; Theodore R. Furman; Charles M. Kinzig

Nov. 16, 1999 (GB) 9927011.8

(57) **ABSTRACT**

(51) **Int. Cl.**
B01D 9/00 (2006.01)

(52) **U.S. Cl.** **23/297**

(58) **Field of Classification Search** 23/297,
23/299, 306, 307

See application file for complete search history.

A method of preparing particles of a substance, for example selected from a flavor, fragrance, pigment, dye, biologically active compound or a plastics material, comprises contacting the substance of a formulation (which may include the substance in conjunction with a second solvent) with a first solvent which comprises a C1-C4 hydrofluorocarbon, especially tetrafluoroethane, and subjecting the resultant mixture to a separation process, for example, by allowing the mixture to be sprayed as a mist (14) from a high pressure environment in a first vessel (2) to a low pressure environment in a second vessel (8), thereby to cause separation of a least some of the substance from the first solvent and the formation of fine particles (20) of the substance.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,932,943 A 1/1976 Briggs et al.

5,470,442 A * 11/1995 Mahler et al. 203/56

5,481,058 A 1/1996 Blackwell et al.

5,665,798 A * 9/1997 Speaks et al. 524/14

5,770,559 A 6/1998 Manning et al.

27 Claims, 1 Drawing Sheet